

AP Chemistry Chemical Bonding

POGIL: Lattice Energy

Guiding Question

How strong are the ionic bonds in an ionic solid?

Why?

When comparing the strengths of covalent bonds, we can use bond energy tables to estimate the energy released when a particular bond is formed. The more energy that is released, the stronger, or more stable the bond. Ionic bonds have a similar quantity called **lattice energy**.

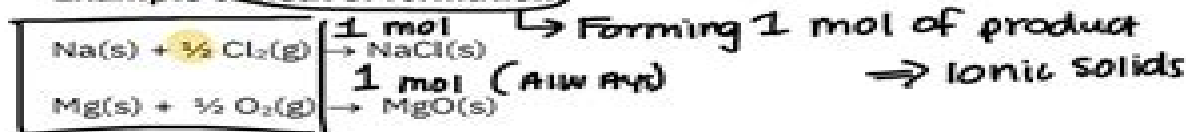
Lattice energy is defined as the change in energy when **ions** in their **gaseous state** form an ionic solid. It is very difficult to directly measure lattice energies for ionic substances, so they are usually theoretically calculated from other data. In this activity, we will look at the variables that determine the magnitude of the lattice energy.

Where to start:

The equation for the **enthalpy of formation** of a compound is the starting point. A few key points to remember:

- * Elements as reactants must be in the **standard state** *Solid; Liquid, gas?*
- * One mole of product must be produced.

Example of heat of formation

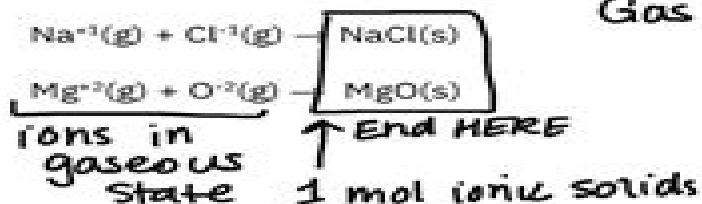


Where to end:

Heat exchange

The process here is to calculate the lattice energy ($\Delta H_{\text{lattice}}$) where elements are transformed from the standard state to gaseous ions to produce a solid ionic compound

Gas \rightarrow Solid



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